The Impact of Board Gender Diversity on Cost of Capital

Investigation of the Swedish Market

Master's Thesis in Accounting and Finance
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Summary

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Five keywords: Cost of capital, Cost of equity, Cost of debt, Board gender diversity, Gender behavior

Purpose: The purpose of the study is to examine if a greater share of women in Swedish public boards has a significant effect on cost of capital as well as cost of equity and cost of debt separately.

Methodology: This study examines the relationship between board gender diversity and cost of capital using a panel regression approach with fixed effects. Control variables and robustness tests have been included in the regression model to ensure the reliability of the results.

Theoretical perspectives: The theories included in the study are agency theory, tradeoff theory, stakeholder theory and signaling theory, which is evaluated in line with previous research of board gender diversity and cost of capital.

Empirical foundation: The data used in the thesis has been collected from Refinitiv Eikon and is based on 1306 Swedish public companies during the time period 2019-2023.

Conclusion: The findings indicate that, for Swedish non-financial publicly traded companies, having a higher number of female directors on the board results in lower cost of capital.

Acknowledgement

Abstract

This thesis aims to investigate if there is an existing relationship between board gender diversity and cost of capital for public firms in Sweden. The study has a quantitative approach and is based on 1306 public Swedish companies during the time period 2019-2023. The study found that more women on the board is negatively associated with cost of capital, which indicates that more diverse boards can add value to firms due to higher efficiency. WACC, this study's main dependent variable, is based on cost of equity and cost of debt. The estimation of cost of debt has a significant negative relationship with the share of women on the board which indicates that more women on the board tend to be related to better lending conditions and lower interest rates. On the other hand, the study found no significance between cost of equity and the share of women in Swedish boards. This could be explained by the difficulties of measuring cost of equity, especially on firm levels. Overall the results of the study indicate that a greater share of women on corporate boards contribute to lower cost of capital.

Table of contents

1. Introduction

1.1 General background

The wakeup of the stock exchange

"The proportion of women in public boards is increasing after last year's disruption. Women have entered male-dominated businesses and are now more likely than before to be found in functions such as IT and Supply chain. In addition, the proportion of women is increasing substantially in prestigious executive roles. A development in line with international trends"

AllBright (2023)

Gender studies in the business sector is highly relevant with a significant increase of female board members in recent years. According to recent data by Morgan Stanley Capital International (2023), there was an increase from an average of 20% of female board members, globally, in 2019 compared to 2023 where the average had increased to 25,8%. The great relevance of female representation on corporate boards is also shown by international institutions taking action. For instance, the European commission which recently adopted a directive with the aim to balance gender diversity in the boards of EU's largest listed companies. The new EU law enables more women to compete for qualified top corporate jobs. The reason for implementing those actions is due to the fact that female directors still lack representation on corporate boards. Accordingly, directives like the European commission directive aims to make significant progress towards a more gender equal Europe (European Commission, 2023).

Sweden is a relevant country to study in the context of gender on corporate boards due to its equal business environment when it comes to gender compared to other countries. According to the Swedish statistical database, 36,4% of board members in Swedish public companies are represented by women (Swedish statistical database, 2023). This is a high number compared to other countries, where the international average is 25.8%. The difference between developed markets and emerging markets has a substantial difference (MCI, 2023). The development of more equal boards is also supported by the Swedish code of corporate governance which has a goal stating that both genders must have at least 40% share in the boards (Government Offices of

Sweden, 2024). Government action has driven the progression forward. Quota legislation is one example of an action taken to force more women into the boards. One of the arguments for implementing such action is stated by the European Commision as a proposal in 2012 with the argument to break "*the glass ceiling*" in order to promote more equality between the genders and increase womens opportunities to compete with men (European Commission, 2012).

Except for the difference between other countries and emerging markets, Allbright also highlights the lack of women on corporate boards in Sweden differ substantially depending on the size of companies and the industry. Allbrights statistics indicate that women tend to have less seats in bigger companies, and more shares in medium- and small size companies. Moreover, the type of industry has a substantial difference in gender composition. For instance, the industry sector only has 24% of women represented in the board compared to healthcare which has 37% representation. The gender statistics with a higher share of women on boards presented by Allbright have one factor in common. It has increased every year and is expected to continually do so (Allbright, 2023).

1.2 Problematization and Contribution

Why would board gender diversity impact the cost of external financing? The relationship between cost of capital and gender diversity may seem indirect at first glance, but upon closer examination, the implications become apparent. Board diversity may enhance the overall quality of board meetings to further improve transparency (Carter et al., 2003; Griffin, Li and Xu, 2021; Randøy, Oxelheim and Thomsen, 2006). Apart from that, according to Adams and Ferreira (2009) and Nguyen (2020), a higher number of women on boards results in more frequent auditing, enhanced board participation and improved accountability from managers. This contributes to more efficient monitoring of both managers and accounting reports, which in the end results in valid and trustworthy information to stakeholders (Adams and Ferreira, 2009; Nguyen, 2020).

In addition to that, Sunder et al. (2017) propose that a more diverse board of directors results in a balanced risk attitude. Furthermore, according to Cumming et al. (2015), female managers are generally more concerned with preventing unethical corporate practices. The increased capacity to handle those issues further enhance the trustworthiness of firms with high female presence on boards and other leading positions. Lastly, prior studies indicate that female presence is a key component to enhance financial performance as well as company reputation (Bear et al., 2010).

The results from prior research of gender diversity, however, are not entirely consistent. A number of disadvantages associated with gender diversified boards have been noticed by prior researchers. Among these disadvantages the most common ones include less efficient decision making processes as a result of differing leadership styles (Litz and Folker, 2002; Fenwick and Neal, 2001), discrepancies and poor decision making resulting from conflicting opinions (Campbell and Mínguez-Vera, 2008; Gallego-Álvarez et al., 2009).

When it comes to studies that have investigated the relationship between gender diversity on corporate boards and the cost of external financing, previous studies indicate with a majority, that a higher number of women on the board results in lower external funding costs. According to Pandey et al. (2019), companies with higher numbers of women on the board have lower cost of debt due to, for instance, enhanced risk oversight where the authors argue that female directors are more risk-averse. Given that female directors, on average, have different risk attitudes than their male counterparts, having a higher number of female directors may help the board in fulfilling its risk oversight obligation (Adams and Funk, 2012).

The following studies conducted by (Abad et al., 2017; Jizi & Nehme, 2017) takes the same positive stand to gender diversity as previously mentioned authors (Carter et al., 2003; Griffin, Li and Xu, 2021; Randøy, Oxelheim and Thomsen, 2006; Adams and Ferreira, 2009; Nguyen, 2020) where they share the same conclusions that women on board improve firms' transparency. According to Abad et al. (2017) and Jizi and Nehme (2017) this provides useful information on the relationship between female directors and the company's cost of equity. This results in an appreciated company reputation and image for companies with a high percentage of female directors. Additionally, overall enhanced transparency can reduce information asymmetry

regarding stock prices and equity markets (Gul et al., 2011; Abad et al., 2017). These previous studies suggest gender diverse boards have a beneficial impact on the equity market, which implies a reduced cost of equity. Gietzmann and Ireland (2005) suggests that similar to debt holders, equity holders need high-quality financial reporting. According to Dobija et al. (2022) increased board gender diversity is correlated with higher quality financial reporting, so if gender diversity increases transparency it could lower rate of return from investors.

According to Hellier and Chasan (2018), large and impactful stakeholders are putting pressure on firm's to raise the percentage of female directors on their boards, which has caught media's attention on this problem. As a result, gender-diversified boards is currently a hot topic, which has attracted researchers to contribute to the literature. While most research has offered empirical support from the shareholder-perspective and investigated the relationship between female directors on corporate boards and firm performance (Tanaka, 2014); the relationship between women's representation on corporate boards and firm's cost of external capital is less studied. Not only is the relationship relatively unexamined worldwide, the studies that exist often focus on either cost of debt or cost of equity separately. Furthermore, the research field lacks studies that examine the relationship in a context where gender diversity is well established, for instance in Sweden.

Therefore, the study aims to fill this gap by investigating how the percentage of female directors on Swedish corporate boards affect the firm's cost of capital. In the realm of corporate governance, Sweden is known for its progressive social policies, dedication to diversity and tolerance, and position as a leader in gender equality measures, which makes it a suitable candidate to study (European Institute for Gender Equality, 2019). Furthermore, cost of capital is a crucial determinant of a firm's capital allocation, investment decisions and firm valuation, making it an interesting financial matrix to investigate (Koller et al., 2020). By examining the relationship between board gender diversity and the cost of capital, this thesis seeks to provide insights that may be used to guide industry practices, corporate initiatives and regulatory actions. By doing so, the thesis aims to contribute to a more nuanced understanding of both the opportunities and the challenges inherent in promoting gender equality in Swedish corporate

boardrooms but also spread this important message to other markets in order to increase awareness of gender diversity in high corporate positions on a global level.

1.3 Purpose and Research Questions

The purpose of this study is to examine the relationship between the share of women on Swedish public corporate boards and cost of capital. Another aim is to examine the relationship between cost of debt and cost of equity separately from cost of capital to investigate their individual relationship with the share of women on Swedish public corporate boards. In order to fulfill the study's objectives, the thesis will be based on the following two research questions:

RQ1: *How is the cost of capital of Swedish public companies related to the board composition of women?*

RQ2: If there is an effect, *what impact does the share of women on corporate boards have on cost of capital, cost of equity and cost of debt separately?*

1.4 Main findings

This study is based on a sample of 1306 non-financial public Swedish companies over a five year period between the years 2019-2023. A dummy variable has been used for the women on corporate boards. This action was made in order to capture the companies where women have a substantial influence over the company's operations. The results of the regression model indicate that when there is a high share of females on corporate boards, the firm's tend to have a lower cost of capital. In reality the result could be explained that for every extra unit (extra female on the board), cost of capital tends to decrease. The result goes in line with the majority of previous research. However, the study found no significant result for cost of equity separated from cost of capital.

1.5 Limitations

The limitations in the study are mostly related to the fact that the data in some cases were only partially accessible. Some observations were not accessible in the sampling because of nonexistent information regarding board composition due to some companies not being public during the entire time period. This outcome made the sample size lower which potentially could have an effect on the conclusions and reliability of the study. Another limitation of the study is that the study uses accounting variables like cost of debt instead of market driven assessment measures like credit ratings. Apart from that, according to Koller et al. (2020), accurately measuring the required inputs to the cost of equity has been proven difficult, making it another limitation with the study. Even though previous academics have proposed different models to measure the cost of equity, no one has proven to have an overall high reliability, definitely not at the firm level. Consequently, it is hard to say if the regression results regarding the cost of equity, solely, is reliable.

2. Literature review

Over the last decade board diversity has become a hot topic with extensive media attention. Because of that, studies have been conducted to investigate the relationship between board gender diversity and different measures of firm performance. However, as mentioned before, only a few are studying the relationship between board gender diversity and cost of debt, respectively cost of equity separately and even fewer its effect on cost of capital. Despite that, this literature review aims to shed light on the empirical evidence and key insights through an extensive examination of existing literature that contribute to our understanding of this relationship between corporate governance and cost of external financing.

2.1.1 Negative relationship

A higher share of female directors and lower cost of capital

In a study conducted on the Australian market by Pandey et al. (2020) the authors found a negative relationship between board gender diversity and cost of debt financing. The regression results implied that companies with a significant critical mass of women on corporate boards have a beneficial effect on the firm's cost of debt due to enhanced risk oversight where the authors argue that female directors are more risk averse. This is likely to be perceived by lenders as a sign of effective internal control, resulting in lower borrowing costs. Furthermore, the study suggests that corporate boards should have at least two women to make an impact (Pandey et al., 2020). This result goes along the line with other studies concluding that at least three female board directors are required to have a positive impact on companies managerial ability (Baghdadi et al., 2023; Guldiken et al., 2019).

Similarly, it was discovered that female representation on Turkish corporate boards reduced the cost of debt (Aksoy and Yilmaz, 2023) as it lowers the risk of credit default which boosts confidence of financial institutions and lenders as the signaling theory confirms (Connelly et al., 2011). Thereby, firms have incentives to hire more female board directors as it helps to increase credit scores which results in more favorable debt financing terms (Datta et al., 2021; Owusu and Zalata, 2023). Consequently, a lower cost of debt financing would provide the company with a competitive edge over its competitors (Garcia-Blandon et al., 2022), which lowers the cost of capital (Ramirez et al., 2022).

The effect of board gender diversity on companies' cost of equity was tested in the US market by Aljughaiman et al. (2022) where they concluded that higher representation of female directors is generally valued by shareholders as it tends to reduce debt levels. Firstly they found that, due to females being more risk averse, companies with a more gender-diverse board tend to have lower debt levels. However, this is only true after the female representation on the board reaches the critical level of 28% due to, when a minority presence of female directors occurs, they do not have enough decision-power to influence corporate decisions. Second, the authors discovered that the presence of female directors are generally valued by shareholders, who tend to lower

their required rate of return as the percentage of female directors rises. Third, the study concluded that funding decisions made by firms with more gender diverse boards are generally perceived favorably by shareholders, which Aljughaiman et al. (2022) suggest may be the result of females being more risk-averse and thereby can prevent companies from adopting high-risk financing structures.

Examining the European market, Garcia and Herrero (2021) found a negative relationship between board gender diversity and cost of debt, leverage, default risk, and debt maturity, indicating that higher number of female directors reduces bankruptcy risk and resulting in less risky capital structures. Their findings also support the notion that female directors, not only, enhance monitoring which reduces agency costs due to greater oversight and accountability in the corporate governance but also confirms the existence of gender behavioral differences in leadership positions. Based on agency theory, women are more likely to monitor than men due to innate gender differences e.g., women are more diligent than men, but also because they are outsiders and not part of the *"old boys network"*, which will increase the efficiency of monitoring (Kirsch, 2018). Lastly, based on corporate governance attributes, a majority of the prior research agrees that gender-diverse boards reduces not only firm risk, but also agency costs because of transparency, effective monitoring and advising capability, which affect not only the cost of debt but the entire cost of capital (Ghouma et al., 2018; Gul et al., 2011; Hashim and Amrah, 2016; Sila et al., 2016; Usman et al., 2019; Diamond and Verrechhia, 1991).

Beyond lowering the external financing costs, the literature suggest that firms which put emphasis on board gender diversity tend to have greater productivity (Frink et al., 2003), lower leverage ratios (Muhammad et al., 2022), lower rates of financial fraud (Wang et al., 2022, better financial results (Sattar et al., 2023), reduced financial risk (Guizani and Abdalkrim, 2023), presenting more reliable accounting information (Anh and Khuong, 2022), which all contributes to a lower cost of capital (Aljughaiman et al., 2022). Furthermore, incorporating both men and women on corporate boards results in more transparency due to increased disclosure of private information (Gul et al., 2011), elevates the quality of board meetings that is more consistently shared with stakeholders (Carter et al., 2003) and more efficient monitoring (Hillman et al., 2007; Adams and Ferreira, 2009; Gull et al., 2018).

Moreover, Ray (2005) found that women exhibit more advantageous attributes in decision making, risk attitude and value judgment. These factors indicate a positive relationship between board gender diversity and firm performance (Gul et al., 2011; Liu et al., 2014; Chen et al., 2016), which not only results in a higher stock value, hence lower cost equity (Aljughaiman et al., 2022), but also a lower cost of capital (Ferreira and Laux, 2007). Additionally, prior research suggests that board gender diversity increases transparency of private information. This results in reduced information asymmetry in both equity and security markets (Abad et al., 2017; Cai et al., 2006) as well as improved stock price informativeness (Gul et al., 2011), and finally reduces companies equity risk when it comes to volatility in stock price (Jizi and Nehme, 2017). All these positive effects results in a lower cost of equity and thereby a lower cost of capital (Botosan, 1997; Francis et al., 2004; Chen et al., 2003; Ashbaugh et al., 2004; Botosan and Plumlee, 2005; Aljughaiman et al., 2022).

2.1.2 Positive relationship or No relationship

A higher share of female directors and higher cost of capital
A higher share of female directors and no difference in cost of capital

Even though a majority of the previous research points towards a negative relationship between board gender diversity and firm's cost of capital, there are multiple studies that do not share the same conclusion.

Gender board diversity can lead to less efficient decision-making processes as a result of differing leadership styles between men and women (Litz and Folker, 2002; Fenwick and Neal, 2001). This inefficiency can cause delays in important business decisions, which can result in missed opportunities and higher operational costs. As a result, lenders and investors might have a negative perception of a firm with less growth opportunities and thereby increasing the cost of external financing, which leads to reduced stakeholder confidence. Ultimately, efficient decision-making is crucial to sustaining a lower cost of capital. According to Kien et al. (2004), the firm's exposure to market risk rises if the board does not choose value-maximizing tactics, which results in systematic risk and ultimately raises the cost of capital. The author continues with the conclusion that a weak corporate governance, that can arise from inefficient

decision-making, may result in poor disclosure and transparency. This in turn can lead to increased cost of issuance and other transactions which will significantly increase the firm's cost of capital even further (Kien et al. 2004).

A higher presence of female directors on corporate boards may lead to discrepancies and ineffective decision-making due to conflicting opinions, which ultimately results in a higher cost of capital (Gallego-Álvarez et al., 2009; Campbell and Mínguez-Vera, 2008). Also Benjamin and Biswas (2017) affirmed that, due to different perspectives, board gender diversity could increase conflict between men and women on corporate boards. The authors suggest that an increase in conflicts may result in a breakdown in communication which leads to higher costs of debt as lenders perceive the company as more risky.

Despite expectations, an investigation on the Norwegian market found no significant relationship between board gender diversity and cost of debt, neither before nor after the introduction of the quota (Garcia-Blandon et al., 2022). When it comes to cost of equity, a study made by Ahsan et. al (2022) show no significant impact on women on board and cost of equity. The study describes that women in the board is linked to a reduction in information asymmetry which should affect cost of equity, but according to the study it doesn't (Ahsan et al 2022).

2.2 Differences between men and women

Research on female directors, as individuals, is crucial as it enables us to create an accurate picture of these particular individuales. This is not only necessary to clarify the discussions regarding the influence of board gender diversity but also to identify the kind of women who are successful in obtaining board positions and their main characteristics. As shown in the previous parts of this thesis, several authors have studied why corporate boards are influenced by gender diversity. In this section, the focus will be to discuss the literature regarding differences between females and males in a deeper sense to give the reader a better understanding of the research front.

2.2.1 Gender behavior and gender diversity on corporate boards

Studies based on the causes and effects of board gender diversity commonly argue that female directors contribute to the diversity of the board as they consistently differ from men when it comes to behavior patterns, personal attitudes, values, experience, skills and knowledge (Jackson et al., 1995; Hillman et al., 2002; Kim and Starks, 2016). These differences are believed to improve board efficiency through a broader range of abilities and diversified expertise, which should ultimately have a positive effect on the cost of capital and firm performance.

One of the hot topics, regarding gender behavior, is risk aversion. While it is typically suggested that women tend to be more risk averse than men, both the evidence and the methods to measure risk are inconclusive. Studies by (Croson and Gneezy, 2009; Aljughaiman et al., 2022; Post and Byron, 2015), suggests that women are, on average, more risk averse than men. However, other research by (Evgeniou and Vermalen, 2016; Adams and Funk, 2012;) opposes this statement. This conflicting evidence highlights the complexity of gender behavior research in relation to risk which underscore the need for further investigation.

The upper echelons theory by Hambrick and Mason (1984), has created a theoretical foundation that supports arguments suggesting that board gender diversity have an effect on company outcomes such as firm performance and capital structure. However, these assumptions may not be true in reality as they base their arguments on the stereotypical man and woman. According to Kirsch (2018) women who have received board seats in publicly traded companies have more similar characteristics with the stereotypical man than the stereotypical woman, which also is noted in the study on the Swedish market by Adams and Funk (2012). Because of that, notions that female directors are more ethical, risk averse, stakeholder-oriented, afraid of conflict, long-term-oriented, diligent, more efficient monitors and inclusive may not apply to women on corporate boards. Therefore, according to the authors, the argument that women on boards are more risk averse may not hold in reality, making it an invalid argument (Adams and Funk, 2012). This notion is further supported by Sila et al. (2016) where they, after a detailed examination, did not find evidence for the argument that board gender diversity influences companies risk taking.

Furthermore, Adams and Funks (2012) mentions that women tend to be more self-directed and seek for higher stimulation than men as the authors implies that women in high corporate positions of publicly traded companies have a reduced need for security due to their successful career advancement, while the opposite applies for the population as a whole. However, men, according to Adams and Funk (2012) seek for achievements and power and put less emphasis on benevolence and universalism compared to female directors. Manita et al. (2018) concludes in their study that a higher percentage of women on board are strongly positively correlated with higher ESG performance that may be a result of a higher degree of benevolence and universalism among women. At the same time, the overinvestment theory that (Jo and Harjoto, 2012) suggest is based on agency theory, indicating that these personal characteristics can result in firms diverting resources from optimal use, resulting in higher cost of capital and reduced firm performance.

2.2.2 Corporate governance

The board of directors is in charge of overseeing the organization as well as the management of the firm's affairs; as such, it bears the primary responsibility for fostering the business to follow regulations and laws (Bolagsverket, 2021; Svensk Bolagsstyrning, 2020). In addition, the board of directors shall regularly evaluate the company's financial situation and ensure that asset management, accounting and financial conditions are managed in a reassuring manner (8:4 ABL 3(2005:551)). Therefore, an effective board plays a crucial role in fostering corporate governance and addressing the company's compliance and long-term stability.

Apart from these responsibilities, the board composition can also affect its efficiency in these roles. Research by Adams and Ferreira (2009) investigates how a presence of female directors on corporate boards can impact factors like attendance and assignments within the committee. Not only did the authors find that women had a higher board attendance than men but also that the higher attendance from female directors resulted in improved attendance from the male directors as well. These findings indicate that board gender diversity has a positive effect on corporate governance by encouraging higher participation in board sessions which will result in greater oversight of the firm's operations. Even though some studies suggests that excessive monitoring can be negatively associated with firm value and performance (Almazan and Suarez, 2003),

according to Adams and Ferreira (2009) the majority of the literature of the field agrees on the argument that this greater oversight is a receipt of stronger governance which should enhance shareholder value. This enhanced shareholder value is a result of corporate boards being preserved as important to manage the agency problem between shareholders and management (Hermalin and Weisbach, 2001; Adams and Ferreira, 2009).

2.3 Board Gender Diversity - Swedish firms

When it comes to gender equality, Sweden is in the forefront. This is based on the high level of education as well as high representation in the Swedish parliament compared to other OECD countries. On the other hand, when it comes to company boards, Sweden also faces a lack of equality (André and Bourrousse, 2017). As previously mentioned, women only have 36,4% of the total board seats in Swedish public companies (Swedish statistical database, 2023). The Swedish government has shown its drive towards gender equality by stating a goal in the Swedish code of corporate governance of having at least 40% women represented in the boards (Government Offices of Sweden, 2024). Additionally, the framework of Swedish corporate governance is commonly acknowledged according to its accountability as well as its transparent way (Svensk Bolagsstyrning 2020). This framework can impact investors' perception accordingly, which can reduce the cost of capital for Swedish firms (Adams and Ferreira, 2009).

Sweden stands out with its 36.4% female representation on corporate boards compared to the international average number that was estimated to 25.8% (Morgan Stanley Capital International 2023; Swedish statistical database, 2023). This could be explained by the fact that Swedish culture is highly influenced by social responsibility and gender equality (Swedish gender equality agency, 2024). The great focus on ESG factors, in this case the social pillar of E(S)G, can have a positive signaling effect, which can potentially impact investor behavior positively. Having a greater share of females on the board can therefore attract more investors willing to invest with a lower required return (Schwartz and Rubel, 2005; Nnadi and Mutyaba, 2023; Nguyen and Rowley, 2015).

3. Theory and hypothesis development

The theories mentioned below are related to the firm's governance structure. It explains the cost of capital as well as cost of debt and cost of equity individually according to the share of women on corporate boards. The theories in the study are used as a support to understand the main ideas of cost of capital and its role when it comes to board composition.

3.1 Theories of governance structure

3.1.1 Agency Theory

According to Jensen and Meckling (1976), agency theory could be explained as a board governance function. Board members are considered "principals" which monitor the managers "agents". The costs which arise due to this process when controlling managerial behavior is agency costs (Jensen and Meckling, 1976). The need for monitoring arises due to the self-serving and opportunistic behavior of the managers or according to the theory, "agents", which exists due to conflicting interests between the agents and the principals (Joseph et al., 2003). The agency theory highlights the separation of ownership and control. Additionally, Jensen and Meckling (1976), explains that in imperfect markets, asymmetric information is one of the main reasons for the agency costs between the principals and the agents. The role of the board of directors in the agency theory is highlighted by Yong Tan (2015) who states that *"the board of directors is the primary internal control mechanism"*. Therefore, the board composition is considered crucial for the outcome of the governance function and the possibility of agency related problems (Yong Tan, 2015).

Related to board diversity, according to Qurat et. al (2020), a higher share of women on the board indicates reduced agency costs. This is explained by women providing better monitoring roles but also possessing greater communication skills than men and therefore an improved information sharing between the firm and its stakeholders (Qurat et al., 2020; Abad et al., 2020). Furthermore, reduced agency costs that occur when closing the information gap between managers and external investors enhances investor confidence due to the lowered risk of investing (Myers, 2015). Accordingly, greater confidence from external investors can lower the

cost of capital due to cheaper financing when raising capital. These statements indicate that corporate board composition has a connection to lower agency costs and lower cost of capital (Nguyen and Rowley, 2015).

The limitations of the agency theory is explained by Nguyen (2009) in the book Guerilla Capitalism. The author describes that the agency theory has the same approach regardless of the setting which can vary a lot and making preset assumptions for human behavior is not necessarily true. The agency theory is ignoring the social background of the actors. For instance, in this case, gender is one background factor that is ignored (Nguyen, 2009). The diversity effect on agency costs is further evaluated by Wijaya (2021), which explains that women on boards tend to be more risk averse and consider ethics more important compared to men. The study indicates that organizations where women have more influence tend to have less conflicts between the agent and the principal which reduces opportunistic behavior. Those characteristics in the board enhances the monitoring ability and therefore reduces the agency costs and accordingly reduces the cost of capital (Wijaya, 2021; Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023; Adams and Funk, 2012).

3.1.2 Tradeoff theory

Culp (2006) describes the tradeoff as an optimal capital structure to maximize the value of the firm. The tradeoff theory explains leverage as the cost of debt and benefits of it in the choice of composition of debt and equity. The benefits of leverage are described as tax shields and reduced agency costs of free cash flow. On the other hand there are also costs related to leverage. For instance, expected costs of financial distress, likelihood of insolvency and underinvestments in growth opportunities (Culp, 2006). This is particularly interesting in the context of board diversity where companies with a higher share of women tend to have a lower cost of debt due to women being more risk averse. This characteristic makes a lower leverage desirable to reduce the risk of distress or bankruptcy which also lowers the cost of capital for the firm (Garcia and Herrero 2021; Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023). On the contrary, Modigliani and Miller (1958) mean that changes in capital structure do not have an influence on the firm value. They evaluate this by arguing that WACC and the firm value is independent of how much debt the firm is issuing, the amount of dividends paid out and the financial risk of the

firm (Modigliani and Miller, 1958). This statement is only true if the M&M assumptions hold, which can be questioned due to the fact that financial policies and capital structure in most cases have an impact on the value of the firm (Culp, 2006).

3.1.3 Stakeholder theory

The Stakeholder theory is discussed by Nnadi and Mutyaba (2023), who base their research on the study made by Freeman (1984), which is considered the "father of the theory". The authors emphasize the importance of stakeholder relationships and highlights Freemans (1984) essence of the theory where he describes the theory as following: *"maintained in identifying, prioritizing and meeting the needs and demands of each one of the concerned parties"*. This approach is exemplified by the authors where they mention that stakeholders are more likely to support an organization which engages in commitment to improve social governance. For instance, improve the diversity of the company by increasing the number of women represented on the board (Nnadi and Mutyaba, 2023). The stakeholder appreciation for a more diversified board is further supported by Nguyen and Rowleys (2015) study which discusses the stakeholder theory from a marketing point of view and means that more stakeholders want to be associated with an organization which engages in sustainable governance as gender equality on the board. Having an equal board composition is a signal of fairness and trust which aligns with most of the stakeholders interests (Nguyen and Rowley, 2015).

The backdraws of using the theory is explained by Monios and Bergqvist (2019) in the book Green Ports, which highlights the problems which arise when identifying the stakeholders. One of the problems is the diverse objectives between stakeholders which could cause conflicts between them. This complicates the legitimacy of particular groups. For instance, a conflict between the priority of increasing the share of women on the board, or having a lower share of women on the board but greater competence if there are more experienced men available for the position (Monios and Berqvist, 2019).

Additionally, there are multiple definitions of "stakeholder" and there is no universally accepted explanation. This leads to a diverse interpretation of the theory and the definition of what a "stakeholder" is (Monios and Berqvist, 2019). The most comprehensive definition is the one of Freeman (1984) which is *"stakeholder is a definition of any individual or group of individuals*

that can influence or are influenced by the achievement of the organization's objectives". As previously mentioned, Croson and Gneezy (2009) describe women as more risk averse than men. A greater share of women in the board could therefore mean, according to what Freeman mentions *"as a group can influence the organizational objectives"*, that more risk averse women in the board contribute to less risk and as Faccio et al. (2016) study shows, lower leverage. Those factors contribute to a lower cost of capital for the firm (Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023).

3.1.4 Signaling theory

Signaling theory is explained by Connelly et al. (2011) as a way for an organization to communicate with its stakeholders. Where the "signaler" wants to communicate a certain signal to the "receiver" in order to shape the receiver's view according to the signaler's interests. The need of signaling is explained by an information asymmetry between the signaler and the receiver. The signaling is a solution to comfort potential stakeholders by signaling certain values and quality of the organization and accordingly reduce the information asymmetry (Connelly et al., 2011), similarly to the agency theory according to Jensen and Meckling (1976). By signaling certain values, organizations can gain legitimacy and achieve long term positive reputation. When it comes to board gender diversity, this could be exemplified as a signal effect, where a diverse board signals equality and diversity which can create legitimacy for actions and improve the organization's reputation (Connelly et al., 2011).

Another study by Solal and Snellman (2019) contrasts the interpretation of a strong signaling effect by having a great share of women on the board. This is exemplified by the argument that investors tend to believe its a weak signaling effect when the number of females on the board is increased in order to satisfy diversity rather than maximizing shareholder value. A diversity preference over maximizing value could therefore signal a priority which is not in line with shareholders interest (Solal and Snellman 2019). Research has shown that signaling is a great tool to reduce the cost of capital for organizations. Signaling can be used to shape stakeholders perceptions and therefore reduce uncertainty (Seo-Young, 2016). A more equal board signals fairness and trust which can reduce uncertainty (Nguyen and Rowley, 2015). In turn reduced

level of risk means lower cost of capital (Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023).

The drawbacks of the signaling theory can be evaluated by using the efficient market hypothesis explained by Fama (1970) which discusses that investors are rational and their behavior is predictable in the long term but less pronounced in the short term. This indicates a downside where the signaling theory assumes predictable behaviors according to the effect of the attempted signaling (Fama, 1970). The perception of risk and uncertainty is far more complex than what the model assumes. Another study made by Ritter (1984) illustrates how misinterpretation and overinterpretation, due to information asymmetry or poor signaling, also leads to mispricing which affects the cost of capital negatively (Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023).

3.2 Hypothesis Development

This section links the literature review with the theories to design the hypotheses.

According to studies researching the relationship between gender diversity and cost of capital, it appears difficult to derive conclusions since the outcomes vary between the studies. A vast majority of the studies find a negative relationship between cost of capital and gender diversity on the boards, although the outcomes seem to differ. Multiple studies indicate that a diverse board is more efficient, due to increased monitoring capacity, enhanced board participation and improved accountability which indicates lower cost of capital (Adams and Ferreira, 2009; Nguyen, 2020; Usman et al., 2019). Some of the advantages of diverse boards are exemplified by more transparent communication and reduced information asymmetry (Abad et al., 2020). Finally, according to studies women also tend to be more risk averse which have some advantages. For instance, reduced financial risk taking as lower leverage ratios (Aljughaiman et al. 2022). According to this information, the following hypotheses for cost of capital are formulated:

H$_{A0}$: A higher share of women on the boards of Swedish listed firms have no effect on cost of capital

H$_{A1}$: A higher share of women on the boards of Swedish listed firms have an effect on cost of capital

As mentioned above the cost of capital is affected by multiple factors related to board composition. However, the cost of debt and cost of equity, which in combination represents cost of capital, is also evaluated separately.

Related to cost of equity, multiple studies support the notion that more diversity on the boards can lower cost of equity. For instance, there is a strong signaling effect of having a diverse board, which signals a commitment to sustainability when it comes to equality. This attracts a broader investment base and the investors are more likely to accept lower returns which lower the overall cost of equity (Connelly et al., 2011; Nguyen and Rowley, 2015). Meeting the needs for all stakeholders can also contribute to lower cost of equity. This is exemplified in the stakeholder theory where commitment to improve social governance is more likely to satisfy all stakeholder. This priority increased the investors interest of being associated with the firm which makes them lower their required returns and improve their conditions, which leads to lower cost of equity (Nnadi and Mutyaba 2023; Nguyen and Rowley, 2015).

Furthermore, having more women on the board enhances the financial performance of the firm due to its increased efficiency. This is explained by the positive impact of diverse backgrounds on the board, where women can contribute with additional expertise to the firm, for instance women tend to have a greater ability of monitoring. By including women on the board, the monitoring function could therefore be improved and accordingly lower the cost of equity for the firm (Hillman et al., 2002; Kim and Starks, 2016; Kirsch, 2018). According to this information, the following hypotheses for cost of equity are formulated:

H_{B0}: A higher share of women on the boards of Swedish listed firms have no effect on cost of equity

H_{B1}: A higher share of women on the boards of Swedish listed firms have an effect on cost of equity

When it comes to the cost of debt it is expected to have an effect due to characteristics of women which has an impact on the cost of debt. This is explained by differences in gender behavior, as mentioned previously where women tend to be more risk averse which also reflect the financial risks taken by the company. This is a positive signaling effect to the stakeholders which is likely to give favorable conditions for the firm to raise debt which lowers the cost of debt (Wijaya, 2021; Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023). On the other hand, the tradeoff theory according to optimal capital structure argues that having too low leverage ratio could be comparable to not utilizing several benefits related to debt, such as tax shields (Culp, 2006). Lastly, according to the agency theory previously mentioned, studies indicate greater communicative skill and more transparency in companies represented by women. This closes the information gap between the firm and its creditors which enhances confidence and lowers the risk of investing which in turn reduces cost of debt (Myers, 2015; Qurat et al., 2020). According to this information, the following hypotheses for cost of debt are formulated:

H_{C0}: A higher share of women on the boards of Swedish listed firms have no effect on cost of debt

H_{C1}: A higher share of women on the boards of Swedish listed firms have an effect on cost of debt

Related to cost of debt, the debt to asset ratio (D/A) represents how leveraged the companies are. Wijaya (2021) describes that the ratio is linked to risk aversion where the risk of financial distress or bankruptcy increases with a higher leverage. When it comes to the gender differences in behavior, it is likely that the D/A ratio will be affected by the gender composition of the board (Wijaya, 2021). Accordingly, the risk aspect is a determinant of cost of capital and in this case, cost of debt. Having a low D/A is a strong signaling effect which reduces uncertainty and reduces cost of capital (Aljughaiman et al., 2022; Guizani and Abdalkrim, 2023; Seo-Young, 2016). Based on this information, the following hypotheses for the debt/asset ratio are formulated:

H_{D0}: A higher share of women on the boards of Swedish listed firms have no effect on leverage (D/A)

H_{D1}: A higher share of women on the boards of Swedish listed firms have an effect on leverage (D/A)

4. Methodology

This section introduces an econometric methodology, more detailed description about the variables used, explanation of the panel regression as well as describing the robustness tests. The study is based on deductive theoretical research to describe the link between women on boards and the relationship with cost of capital.

4.1 Panel regression

The relationship between cost of capital and the share of women on boards has been examined in the program Stata, with a fixed effects approach in the panel regression. The panel data structure is favorable compared to a cross-sectional data setting because it can observe data for the firms over a period of time. The fixed effect model allows to fully average-out the fixed effect term *$\beta 0$*, which helps to reduce the omitted variables bias effects by controlling for time-invariant unobservable factors. This is one of the advantages with using a fixed effects model instead of a POLS as it can not capture the observed nor the unobserved time-invariant variables. Furthermore, the study uses this approach to include group-specific dummy variables in the regression model. For instance, the variable *womenover25percent* is used in order to account for unobserved heterogeneity.

The choice between the fixed effects model and the random effects model is motivated by a Hausman test, see table 2 in the appendix. Since the P-value is 0,000, which indicates significance, the null hypothesis is rejected in favor of the fixed effects model (FE). The FE model is underpinned by the Hausman test where the heteroskedasticity issue is controlled for with the usage of clustered robust standard errors. Furthermore, another notion that supports the fact where the study is protected from endogeneity is that there is no logical explanation for

potential reverse causality e.g., it is not likely that the firm's cost of capital might influence the gender composition of Swedish corporate boards.

4.2 Univariate tests

4.2.1 Variables

The financial metrics that are used as dependent variables in this thesis are cost of capital (WACC), cost of equity (COE), cost of debt (COD) and debt to assets (D/A). As the main explanatory variable (independent variable) the study uses the proportion of women on corporate boards, generated as a dummy variable, *womenover25percent*. This dummy variable is equal to one if firms have a female representation on the board, corresponding more than 25 percent and zero otherwise. To manage outliers, all accounting variables have been winsorized at the 1 st and 99th percentile.

According to Sundell (2012), false relationships also known as spurious relationships can appear when conducting the regressions. This suggests that although the results of the regression show a significant relationship between the dependent and independent variable, the relationship could be caused by other factors. Therefore, a variety of control variables that possibly could impact the dependent variables are included to be able to present robust results. These control variables are board size, return on assets, market to book ratio, capex, total assets, debt to asset ratio, year controls and industry controls.

4.2.2 Dependent variable

Cost of capital - WACC

$$WACC = E/V \ * \ re \ + \ D/V \ * \ rd \ * \ (1 - Tc)$$

Where:
- E = Market value of the firm's equity
- D = Market value of the firm's debt

- V = Total market value of the firm's financing (Equity + Debt)
- re = Cost of equity
- rd = Cost of debt
- Tc = Corporate tax rate

In corporate finance, the Weighted Average Cost of Capital (WACC), is a crucial indicator that measures a firm's cost of capital. This holistic metric captures the average rate of return that an organization is anticipated to provide to its investors, factoring both debt and equity financing based on their proportional contribution to the organizations total financing. Furthermore, it incorporates both the time value of money and the risk associated with investments in a company (Koller et al., 2020). According to (Koller et al., 2020; Damodaran, 2012; Ross et al., 2019; Brealey et al., 2017; Rehman and Raoof, 2010), WACC is a significantly important parameter when it comes to firm valuation and decision-making but also for financial analysis like capital budgeting analysis. The cost of capital is also the rate that one compares with the return on invested capital to understand if the company is creating value or not, which further enhances its relevance (Koller et al., 2020).

Firstly, WACC offers a comprehensive understanding of a firm's cost of capital by including both equity and debt components, providing a holistic evaluation of the firm's financial commitments and obligations. Moreover, due to the fact that the weighted average cost of capital takes market values into consideration when evaluating the cost of debt and equity, WACC accurately reflects current market conditions, facilitating informed decision-making (Ross et al., 2019). Secondly, according to Damodaran (2012), WACC's accountability as an accurate parameter that measures the true cost of capital is further improved by accounting for the tax shield benefit related to debt financing. The tax deductibility adjustment highlights the reliability of WACC in assessing the company's financial obligations. Lastly, WACC can be used as a benchmark to analyze investment opportunities, capital budgeting choices and assessing a project's financial viability (Brealey et al., 2017). According to Ross et al. (2019) returns on projects that surpass WACC are considered value increasing and those that don't may warrant reconsideration.

Cost of equity - COE

$$Cost\ of\ Equity = Rf + Bi * (Rm - Rf)$$

Where:

- Rf = The risk free rate of return which represents the return on a risk-free asset.
- B = The beta of the investment, indicating its sensitivity to market changes where a beta of 1 suggests that the company risk are equal to the market risk, while a beta lower than 1 indicates lower risk, and higher than 1 indicates higher risk.
- Rm = The expected market return, representing the average return from a market index.

The cost of equity is the return that equity investors expect from an investment in the company based on the degree of risk. According to Koller et al. (2020), it is a central building block of the cost of capital but also a crucial concept in corporate finance overall, as it serves as a cornerstone in corporate valuation where it is used in models like the Discounted Cash Flow (DCF) to discount future cash flows to determine a firm's value. Apart from that, the cost of equity represents the lowest rate of return that investors expect from owning the company's shares, which is affected by company specific risk, broader economic conditions and market trends as these factors may influence the investment (Koller et al., 2020).

As companies seek to reduce their cost of capital in order to increase firm value, it is crucial to comprehend the cost of equity to be able to make informed decisions regarding capital structure (Modigliani and Miller, 1958). If the cost of equity is higher than the cost of debt, it can affect the choice between equity and debt financing, according to the trade of theory (Modigliani and Miller, 1958). Just as a high cost of equity might signal that investors perceive the company as risky, a low cost of equity indicates that investors trust in the future stability and growth of the business.

Given these reasons, using cost of equity as a dependent variable in the regression model allows for a better understanding of what factors that have an impact on investor expectations and the cost connected to raising equity capital. It can also reveal crucial insight into how firms can

manage their cost of equity in relation to their corporate governance and how this could increase value for shareholders at the same time as it lowers the cost of equity financing.

Cost of debt - COD

Cost of debt = Total Interest Expense/Total Debt

Where:
- Total Interest Expense is the total amount of interest paid on the firm's debt over a period of time.
- Total Debt represents the total outstanding debt, including bonds, loans, or other financial liabilities.

Cost of debt (COD) is a crucial measure in corporate finance which reveals the effective rate a firm pays on its borrowed funds such as loans, bonds or other financial obligations. The parameter is a key component in determining a firm's capital structure and is used to evaluate the total cost of using debt to finance operations. By incorporating cost of debt as one of the dependent variables in the regression model, the thesis aims to provide valuable insights into different corporate financial decisions such as composition of capital structure, debt issuance and associated risk.

According to Brealey et al. (2017), the cost of debt can be used, not only as an indicator of a company's risk profile, but also a metric determining its financial health. A high cost of debt could be a signal of financial distress where the firm is having trouble meeting its debt obligations. Apart from that, the cost of debt can also help companies to make informed decisions regarding its capital structure as they can prioritize the most cost-efficient type of financing and thereby reduce the total cost of capital (Ross et al., 2019). Furthermore, the parameter can be useful when companies plan their long term strategies as it allows them to optimize their debt levels, manage interest expenses and refinancing to enhance profitability (Hillier et al., 2019).

To further enhance the analysis of cost of debt and to better understand cost of debt in the context of leverage, the study includes the debt to asset ratio, as a dependent variable *(D/A)*, see table 3 in the appendix. This is relevant according to previous studies where it indicates that boards with a higher share of women tend to be more risk averse and therefore, companies with higher numbers of female directors tend to have lower leverage (Aljughaiman et al., 2022; Wijaya 2021). The variable is calculated as below:

$$D/A = Total\ Debt/Total\ Assets$$

4.2.3 Main explanatory variable and Dummy variable

The main explanatory variable is made as a dummy variable and is labeled, *womenover25percent*. The reasoning behind choosing this variable as the main explanatory is because it is the most suitable measure of board gender diversity. Refintiv Eikon provides this data as: *Women on the board/Total board members*. The argument for adding the dummy feature is to capture the firms where women have a significant impact on the firm's cost of capital. The impact of women on the board with less than 25% of women representation can be questioned. As previously mentioned in section 2.1.1, this argument is supported by (Pandey et al., 2020; Baghdadi et al., 2023; Guldiken et al., 2019; Aljughaiman et al., 2022), where the authors argue that boards should have a minimum of two or around 28% representation of females to have an actual impact on the firm's operation. Furthermore, since there as previously mentioned are great differences when it comes to industry and year, a dummy variable is also necessary in order to stabilize the distribution accordingly.

The argumentation in the paragraph above suggests that firms with more women are more suitable to study when measuring cost of capital. Therefore, we distinguish the firms depending on their board composition. The boards with more than the average value of 25% of women are labeled "1", and the firms with less than 25% are labeled "0" in the regression. The firms with a score less than the threshold of 25% is considered weaker to explain the impact of women on the board. The firms with more than 25% is considered to have a greater impact and a stronger explanation of the effect of more women. The dummy variable used in the study aims to show

that the cost of capital of firms is different when there is a substantial amount of women in the board compared to when there are few or none. Adding the dummy variable to the regression provide the following model:

$$WACC_{i,t} = \beta0 + \beta1womenover25percent_{i,t} + \beta2logassets_{i,t} + \beta3Size_{i,t} + \beta4Leverage_{i,t} + \beta5Profitability_{i,t} + \beta6Capex_{i,t} + \gamma\acute{y}ear\ controls + \lambda industry\ controls + \varepsilon i,t$$

4.2.4 Control variables

Board size

Kalsie and Shrivastav (2016) conclude in their study that size matters when it comes to corporate boards. The study found a positive and significant relationship between board size and firm performance. This was motivated by the authors where they described that a greater board size means a greater representation, this in turn implies more knowledge and expertise on the board. Additionally, the monitoring capacity is also likely to increase with a higher representation of board members (Kalsie and Shrivastav, 2016). However, having a large board is not an advantage in every aspect. In a study conducted by Paul (2009), the author explains that larger boards suffer more from poor communication and lack of efficient decision making compared to smaller boards. To conclude, there are different views of the board size. However, most studies find a relationship between board size and firm performance, hence it is also likely to affect cost of capital. Therefore, board size should be included as a control variable.

Firm size

The variable labeled as *logassets* in the regression is another variable which can have potential effects on cost of capital. Similarly to previous studies within the field of corporate governance, firm size is also in this study, computed as the natural logarithm of total assets (Ammann et al., 2011). A previous study describes that a greater company size has a relationship with lower cost of capital. The arguments are based on economies of scale, cost advantages and greater negotiation abilities which are characteristics of larger companies (Alberts and Archer, 1973). In contrast to larger firms, Eugene et al. (2007) discussed the cost of capital for smaller firms and found that smaller firms tend to use more debt financing compared to larger companies. By using excess debt, they take part in several advantages, such as the use of tax shields. The study also

describes that investors of smaller firms are more likely to accept lower rates of returns of investment. Those characteristics of smaller firms enable a reduced cost of capital (Eugene et al., 2007). Previous studies that find significant relationships between firm size and cost of capital highlights the importance of including it as a control variable in this study.

Leverage

The firm leverage describes the financing of external capital. The use of debt enables the company to engage in investments, expand and from this gain advantages. On the contrary, there is also extensive risk associated with higher leverage ratio which can damage stakeholders confidence of the firm (Ibhaguia and Olokoyob, 2018). The higher leverage ratio which is associated with greater risk of default or bankruptcy leads to a significantly higher cost of capital compared to a company with a lower leverage ratio (Haag and Koziol, 2023). As previously mentioned, according to risk aversion, boards with more women tend to be more risk averse and therefore have lower leverage ratios due to the reduced risk (Aljughaiman et al., 2022). The impact of leverage on firms and the risk aversion aspect make this variable suitable to include in the regression model.

Industry

As Allbright (2023) previously mentioned, there are great differences of board composition depending on industry. This means that the type of industry, according to table 5 in the appendix, that the firm operates in has a relationship with women on the board and potentially the cost of capital. Dummy variables are used for each industry to account for these in the regression model to exclude potential specific effects according to industry. The classifications of the industries range from "1-10", and the classification is given within this range depending on the industry the company operates in, see table 5. The study excluded the financial industry. This decision is motivated by a standard argument, stated as the following: *"financial services firms differ from typical firms because they tend to have much greater leverage and increased sensitivity to financial risk"* (Foerster and Sapp, 2005).

Year

The study is conducted over a five year period, therefore the study includes dummy variables for each of the years. This is done to handle year specific effects in the regression. This is crucial when examining the relationship between women and board size due to the fact that the amount of women on corporate boards has increased significantly during the time period (Allbright 2023).

Profitability - (Return on assets and market-to-book ratio)

Performance in this study is evaluated by using Return on Assets to represent operating performance. Additionally, market-to-book-ratio is used, which is a proxy for the performance of the stock market. It is used to assess the companies growth perspectives where a high market-to-book-ratio likely indicates that the company has strong investor confidence and is using its capital efficiently, which reduces cost of capital (Ball et al., 2020).

Capital expenditures

Capital expenditures (Capex), can be described as a proxy for investment activities. Higher levels of Capex indicates growth opportunities, therefore the variable can be viewed as a possibility of higher returns, where investors expect higher returns due to the growth opportunities that come with increased Capex. Increased growth opportunities and greater investor confidence have an impact on cost of capital (Koller et al., 2020; Ball et al., 2020).

The main focus of the analysis is, as mentioned, to examine the relationship between cost of capital and board composition of gender using multivariate analysis which is clear in the formulation of the hypotheses. The control variables: board size, firm size, leverage, industry, year, return on assets, market-to-book-value and capital expenditures have been included in the multivariate model. The relationship is studied during the time period 2019-2023, the following panel regression as previously mentioned is formulated the following way:

$WACC_{i,t} = \beta0 + \beta1womenover25percent_{i,t} + \beta2logassets_{i,t} + \beta3Size_{i,t} + \beta4Leverage_{i,t} + \beta5Profitabilit_{i,t} + \beta6Capex_{i,t} + \gamma\acute{y}ear\ controls + \lambda industry\ controls + \varepsilon i,t$

4.3 Robustness test

Additional tests have been included to increase robustness and therefore also the reliability of the regression model. Given the sample distribution on the Swedish market, the regression has the variable "industry", included as a robustness test due to, as previously mentioned, the substantial difference of board composition depending on industry. This highlights the importance of including a control of the industry. Additionally, a timeframe of five years is used to prove that the model is stable over a time period, which makes the result more robust (Wooldridge, 2019).

Except for the fixed effects, the study also includes a POLS test to compare and make the result even more robust. The POLS test, see table 4 in the appendix, contrasts the fixed effects regression and indicates a positive relationship, the opposite of the fixed effect regression. The reason for this could be explained due to presence of unobserved heterogeneity and/or omitted variable bias which the fixed effects regression captures (Wooldridge, 2019). The risk of facing those issues when researching board composition is not excluded due to various characteristics reflected in the topic as, governance structure and industry dynamics. Those characteristics represented by the board composition's relationship with cost of capital might not fully capture all variables. Moreover, there might also be additional gender variables which could have been used as robustness measures to further strengthen the robustness of the study.

5. Data Descriptives

This section describes the collection process, the data and choices made to select the most relevant data for the study. The authors motivate the decisions made in the process according to the circumstances related to the topic. Table 1 in the appendix summarizes all the statistics used for every variable included in the study.

5.1 Sample Selection

The sample used in this study is based on publicly listed firms in Sweden, active during the time period 2019-2023. Initially, the study consisted of 8435 observations. The data that has been obtained is secondary data, collected from a well known financial database, Refinitiv Eikon. All

Swedish listed companies with accessible data were extracted from the database which was 1708 companies. Since listed firms in Sweden face certain requirements of the data reported, it is considered reliable and objective. The differences between the listed and non-listed Swedish firms motivated the choice of only including listed firms, to ensure more reliable results.

All industries have been included in the sample except financial firms, which represents 2008 observations and 402 companies. This is motivated in Foerster and Sapps (2005) study where they discuss the great difference in capital structure of financial firms. Financial firms typically have greater leverage and are therefore more sensitive to financial risk compared to other industries. Including the industry of financials can therefore skew the result (Foerster and Sapp, 2005). The remaining sample after excluding financial firms were, 1306 companies with a total observations of 6427, including all the observations which were public within the five years time frame of the study. The 6427 observations is considered a sufficient amount and therefore the reduction of 2008 observations is not expected to lower the reliability of the result.

5.2 Sample Description

The study is based on listed firms in Sweden for multiple reasons. Firstly, Sweden is internationally in the forefront of gender equality on corporate boards (André and Bourrousse, 2017). This makes the choice of country particularly interesting where the effect is likely to be more significant due to higher female presence on the boards. This can be compared to other countries where the share of women has lower representation which makes measuring the effects more complex. The reason for not including other Nordic countries which have a similar approach to gender diversity was motivated by the fact that Sweden already had a substantial number of observations (6427), and therefore it was not necessary to extend the sample further. Additionally, the policy and regulations are not identical in all nordic countries even though the policy is similar, which could skew the results. Secondly, the time period of 2019-2023 is motivated by, as previously mentioned, the rapid increase of women on corporate boards every year (Allbright, 2023). A time period of five years is therefore expected to indicate effects due to the higher share of women the last year compared to the first year of the time frame.

5.3 Univariate analysis

The variables in the summary statistics, table 1 in the appendix, have been further analyzed to check the validity of the data. The variable of greatest interest is the main explanatory variable, *womenover25percent*. This variable is describing the firms consisting of more than 25% of women represented on the board. The mean value of the variable is observed to be 0.23 and the variability has a standard deviation of 50% which is expected due the the characteristic of a dummy variable where the value is either 1 or 0. The value 0.23 indicates that 23% of the sample has more than 25% female board directors, which is a high enough number of observations to ensure reliability of the results.

The board size has been controlled according to table 1, which states that Swedish public boards should minimum have three board members (Bolagsverket, 2021), which is in line with the data in the summary statistics. The minimum and maximum value show a great variability which is not surprising due to the fact that the number of board members is often related to company size, which according to *logassets* standard deviation indicates that it can differ a lot. The study made by Boone et al. (2007) describes that the differences in board size, except for company size, can be explained by the complexity of the firm. Highly complex firms require more competence which can be compensated by more board members. Another explanation is the industry or environment, where some require more effort than others to work within. The last determinant according to the study is the negotiation between the CEO and outside directors (Boone et al., 2007). To conclude there are many different determinants of board size, explaining the great variation of the variable in the summary statistics.

Furthermore, *ROA* and *MTB* are used as measures of firm performance. The variables are winsorized in order to address the issue of outliers. The summary statistics indicate that the data is heterogenous in both cases where it varies from -25% up to 18% and the mean is observed to be 3% for *ROA*. *MTB* varies from 0 to 37.84 and the mean is 2.53. The variability for those performance measures is explained in a study by Salim (2020), which indicates that determinants such as human capital efficiency and structure capital efficiency have a great impact on the companies performance. As previously mentioned, the efficiency of companies varies due to

multiple reasons, one of them is the gender composition of the board (Kirsch, 2018). The variation for those variables is therefore accepted.

The variable *debttoassetratio,* which is also winsorized, indicates great variability with a minimum value of 1% and a maximum value of 92%. This statement is supported by the standard deviation of 21%. That variability in leverage of a company does not come as a surprise. Some companies are heavily leveraged while others are not. This is explained by Padrón et al. (2005) in their study of spanish corporations which highlights that firm age, risk profile and firm size are determinants of company leverage. As the sample is based on multiple companies which differ in all of those determinants, the variation in the summary statistics which indicates heterogeneity for *debttoassetratio* is considered valid (Padrón et al., 2005).

The mean of *womenboard* is 25% which is considered low compared to the previous studies in the thesis which indicate 36% of women representation in the boards for Swedish companies (Swedish statistical database, 2023). This could be explained by the median which is observed to be 0.33 which indicates that there are many boards with few or no women at all. This is likely to skew the distribution, indicating a large variability. Additionally, the study does not include non-listed companies, which according to the Allbrights (2023) study, have a larger representation of females on the board, which is another explanation for the low mean value. The high variability for *womenboard* is exemplified in the summary statistics which observe a variation of 21% in the standard deviation, which is motivated by the maximum value of 75%.

6. Empirical Analysis

The purpose of this section is to analyze the regression results by using the theories and studies presented in the thesis related to the topic of board diversity. The impact of gender composition on boards is analyzed according to cost of capital, cost of equity as well as cost of debt.

6.1 Cost of capital

The results from table 3, model 2 in the appendix suggest that there is a statistically significant negative relationship between the main explanatory variable, *womenover25percent*, and the dependent variable *WACC*, with a coefficient of -0.001 but only at the 10% significant level. This means that we can reject the null hypothesis, H_{A0}. Having a one star significance instead of the more desirable two or three star significance implies a less robust relationship, even though the results still can be valid. The 10% level of significance also indicates that there might be other factors that the regression does not capture. This might affect the cost of capital, which increases the uncertainty of the results. However, the negative coefficient and the statistically significant relationship indicates that a firm's cost of capital is slightly reduced when there are more than 25% women on Swedish corporate boards. Moreover, the significance of the result can be contradicted according to section 5.1 where the study excluded 2008 observations which could have an impact on the outcome of the regression results by excluding a whole industry.

According to Aljughaiman et al. (2022), the negative relationship with cost of capital can be a result of higher board gender diversity as it tend to reduce financial risk (Guizani and Abdalkrim, 2023), increase productivity (Frink et al., 2003), improve financial results (Sattar et al., 2023), lower debt levels (Muhammad et al., 2022), lower rates of financial fraud (Wang et al., 2022 and lastly, present higher quality of accounting information (Anh and Khuong, 2022). The lower debt levels can be linked to the tradeoff theory by signaling to stakeholders that the firm prefers to reduce agency costs and financial distress but also increasing the financial flexibility over the tax shield benefits (Culp, 2006), which can result in lenders and investors demanding lower cost of external financing.

Apart from these previously mentioned reasons for a lower cost of capital, Gul et al (2011) suggests that this negative relationship can be a result of increased disclosure of private information and thereby higher overall transparency. Furthermore, previous research implies that board gender diversity may result in improved quality of board discussions and more efficient monitoring, which ultimately can improve the cost of capital (Hillman et al. 2007; Adams and Ferreira, 2009; Gull et al., 2018). According to Adams and Ferreira (2009), more efficient monitoring goes hand in hand with strong governance which increases the shareholder value.

This efficient monitoring is crucial to manage the agency problem between shareholders and management as it prevents the management from acting based on self-interest which can enhance both firm performance and firm value (Hermalin and Weisbach, 2001; Adams and Ferreira, 2009; Fama 1970; Abad et al., 2020) due to the fact that the company's resources are used optimally according to the overinvestment theory (Jo and Harjoto, 2012). A strong corporate governance that reduces agency costs and prevents management from diverting capital from optimal use can be a possible explanation for the lower cost of capital as this, according to the signaling theory, is appreciated by investors and lenders who have invested in the company (Connelly et al., 2011).

Another explanation for the reduced cost of capital can be, as Ray (2005) argued, that women have different traits than men when it comes to risk attitude, value judgment and decision making. According to (Gul et al., 2011; Liu et al., 2014; Chen et al., 2016) these factors enhance firm performance, which can result in increased stock value (Aljughaiman et al., 2022) and thereby a lower cost of capital (Ferreira and Laux, 2007). Furthermore, previous studies conclude that female directors differ from their male counterparts when it comes to behavioral styles, personality traits, attitudes, values, experience, ability, skills and knowledge (Jackson et al., 1995; Hillman et al., 2002; Kim and Starks, 2016). According to these authors, this will improve board efficiency and thereby ultimately improve the cost of capital.

Lastly, how can the Swedish context have influenced the result? According to Svensk Bolagsstyrning (2024), the swedish corporate governance framework is widely recognized for its accountability and overall transparency, which according to Adams and Ferreira (2009) can have a positive impact on stakeholders' perceptions and thereby lower the cost of capital for Swedish companies. Additionally, ESG factors are of great relevance in Sweden and can work as a signaling effect to attract more investors that are willing to invest at a lower required rate of return due to the higher ESG score. Because of that, a more gender diverse board which increases the ESG score can have a positive impact on Swedish firm's cost of capital (Schwartz and Rubel, 2005; Nnadi and Mutyaba, 2023; Nguyen and Rowley, 2015).

6.2 Cost of equity

For cost of equity, the results in table 3, model 4 indicate a negative relationship between cost of equity and women on boards as the variable *womenover25percent* is estimated to -0.000. However the result is not significant, indicating that the independent variable has no impact on the dependent variable, which in this case is cost of equity. The non-significant relationship means that we can't reject H_{B0}, representing the null hypothesis for cost of equity. Some previous studies mentioned in the thesis support this outcome, where the impact of females on the board and the impact of cost of equity is difficult to measure. Ahsan et al. (2022) show in their study that the number of females on board and cost of equity has no proven effect. On the contrary, other studies have proven that women have an impact when it comes to reducing information asymmetry which affects the cost of equity positively. For instance, (Qurat et. al 2020; Abad et. al 2020) describe this in their studies, where they argue that women have better communication skills and can therefore reduce information asymmetry and accordingly agency costs that occur due to information asymmetry.

Furthermore, one important aspect when evaluating the effects of cost of equity is the signaling theory where a more diverse board is perceived as a positive signal by investors. This leads to investors requiring lower returns due to the fact that there is a greater representation of women on the board. This argument should be particularly strong in the regression model used in this thesis where women representation in Swedish public boards is greater compared to other countries (Nnadi and Mutyaba, 2023; Nguyen and Rowley, 2015; André and Bourrousse, 2017). Despite the study being conducted on Swedish firms, the result of cost of equity is still not significant. According to company size this could be explained by the fact that many corporate boards do not have enough females to have an actual impact (Baghdadi et al., 2023; Guldiken et al., 2019).

The regression model 4 which resulted in a non-significant relationship between women on the board and cost of equity is further supported by another study made by Solal and Snellman (2019). The study shows that the investors main interest is maximizing returns and the gender composition adds no additional value, but it can lead to increased cost of equity if the board composition is a result of diversity rather than maximizing returns for investors Solal and

Snellman (2019). The non-significant results in the regression model can therefore be explained by investors' indifference towards board composition as long as the firm aims to maximize the returns.

Gender behavior is one of the main arguments when evaluating the relationship between women on corporate boards and cost of equity. Many studies mentioned in the thesis have shown differences when it comes to characteristics between men and women which is likely to impact cost of equity (Jackson et al., 1995; Hillman et al., 2002; Kim and Starks, 2016). The non-significant relationship is also supported by the upper echelon theory (Hambrick and Mason, 1984), where they conclude that the comparison between the genders is based on stereotypes and therefore necessarily not true. Another study also shows that women that enter corporate boards have a greater tendency to have manly features (Kirsch, 2018). Additionally, this is further supported by Nguyen (2009) who exemplifies the limitations of the agency theory. The author emphasizes that it's difficult to make assumptions about human behavior as the settings can vary a lot. To conclude, those studies indicate that the difference between the genders in the context of board composition is difficult to measure, non-existent or simply too small to have a proven impact on cost of equity.

6.3 Cost of debt

The coefficient of the investigated relationship between cost of debt and women on boards, is estimated as a statistical significant, negative relationship at the 5% level with a coefficient value of -0.001**, see table 3 model 3. The estimation of the relationship suggests that when there are more women represented on the board, the interest rates of loans tend to be lower. The null hypothesis related to cost of debt, H_{C0}, is therefore rejected. The variable *Board size* is also significant on a 10% level. This means that the board size explains the relationship between the amount of women on the board and cost of debt. This finding is supported by Aljughaiman et al. (2022) who mentioned that more gender diverse boards only tend to have lower debt levels when the representation of females is above 28%. This is exemplified by describing that a minority of females do not have enough influence over the firm to make a substantial difference. The independent variable feature of including boards with more women than 25% could, according to this finding, be necessary to show significance. The negative relationship between more women

on the board and lower cost of debt, is supported by multiple previous studies presented below, which have concluded similar results as this thesis.

The negative relationship is supported by Pandey et al. (2020) which found that more women on the board enhance risk oversight due to the risk averse characteristic of women. Moreover, women are considered to be more diligent than men. Those female attributes are further supported by the studies of behavior differences of men and women when it comes to personal attributes (Jackson et al., 1995; Hillman et al., 2002; Kim and Starks, 2016; Kirsch, 2018). Implementing a greater risk oversight in the organization is expected to streamline the internal controls. This can be related to the agency theory where agency costs could be reduced, related to the improved monitoring function of more efficient internal controls. Additionally, those characteristics contribute to a positive signaling effect to lenders, where a greater risk aversion is signaling lower risk for the creditors, making them more willing to provide better lending conditions (Pandey et al., 2020; Qurat et al., 2020; Abad et al., 2020; Seo-Young, 2016).

Satisfying stakeholders like creditors, is further supported by the stakeholder theory which emphasizes that stakeholders want to be associated with an organization which is prioritizing the needs of everyone in the firm. Having a diverse business is more likely to satisfy all concerned parties which can enhance the relationship with the creditors. This in turn can provide greater lending conditions (Nguyen and Rowley, 2015; Nnadi et al., 2023). Lastly, implementing female attributes will give the firm competitive advantages due to the overall lack of those attributes in most firms. All of the risk reduction and efficiency improvements will lower the cost of debt for the firm (Garcia et al., 2022).

6.3.1 Leverage

The leverage ratio variable *D/A*, indicates a strong negative significant relationship with women on board on the 1% level (***), with a coefficient of -7.170, see table 3 model 1. The regression result explains that when there is a greater share of women on the board, the leverage ratio (Debt/TotalAssets) tends to be lower. This finding is supported by multiple studies, presented below, which examine female representation on board and its relationship with default risk.

Aksoy and Yilmaz (2023), concluded in their study on Turkish corporate boards that a greater representation of females on boards is related to reduced risk of default. Additionally, Garcia and Herrero (2021) that studied the European market found similar results where leverage, default risk and debt maturity are negatively correlated with gender diversity. Boards with gender diversity are also characterized by lower debt ratios (Muhammad et al. 2022). Low default and bankruptcy risk is typically associated with a lower leverage ratio. This supports the result of the regression in table 3 model 1, where more women on the board has a significant relationship with a lower leverage ratio. As a result of those findings, a lower leverage ratio is thereby related with lower cost of debt (Garcia et al., 2022; Pandey et al., 2020; Hillman et al., 2002).

The leverage ratio can be related to the tradeoff theory as it is based on an optimal capital structure. Culp (2006) exemplifies the tradeoff theory according to cost of debt by describing the benefits and disadvantages of leverage. The author emphasizes the higher expected costs of financial distress and likelihood of insolvency related to a higher leverage ratio. According to gender studies, firms with women influence tend to be more risk averse and therefore having a lower leverage ratio. The capital structure is therefore influenced by the board diversity and accordingly the risk profile which has an impact on the leverage ratio. The typical capital structure with less debt associated with women is more appreciated by creditors which prefer lower risk for invested capital. The less risky capital structure can therefore provide more favorable lending conditions and therefore lower cost of debt (Garcia and Herrero, 2021; Culp, 2006; Seo-Young, 2016; Aljughaiman et al., 2022).

7. Conclusion

The purpose of this thesis was to examine the relationship between board gender diversity on Swedish public corporate boards and their cost of capital. Additionally, the study aimed to investigate the relationship between cost of equity and cost of debt separately from cost of capital to examine their individual relationship with the share of women on Swedish public corporate boards. After gathering a large sample of data, conducting statistical tests and finally analyzing the results using previous research and theoretical models, several conclusions can be drawn.

The findings indicate that, for Swedish non-financial publicly traded companies, having a higher number of female directors on the board results in lower cost of capital. This relationship has a coefficient of -0.001 and is significant at the 10 percent level, suggesting that a higher representation of women on corporate boards may result in lower financing costs. According to previous research and theoretical frameworks this negative relationship can be explained by reduced risk and stronger corporate governance. On the other hand, when examining the relationship between cost of equity and board gender diversity, the study did not find a significant result. A possible explanation for this lack of significance is the complexity of accurately measuring the required inputs to the cost of equity, especially at a firm level, making the regression results less reliable. The limited impact that board gender diversity has on a firm's equity value and overall returns could be other possible explanations to the non-significant regression result.

In contrast to cost of equity, the regression results associated with the relationship between cost of debt and board gender diversity were significant at the 5 percent level with a coefficient of -0.001. This indicates that firm's with a higher board gender diversity, on average, receive more favorable terms of lending, possibly due to reduced agency costs as a result of increased monitoring. Additionally, the study found significant results for the relationship between the debt to asset ratio and board gender diversity at the 1 percent level with a coefficient of -7.170, indicating that a more women on corporate boards results in reduced leverage and thereby lower default risk. This is another explanation for the negative relationship to the cost of debt where firms with more female board directors have lower risk and therefore receive lower lending costs.

Lastly, both the robustness test in section 4.3 and the significance at the 10 percent level for the dependent variable WACC invites further investigation. Additional control variables or perhaps other model settings could be used to ensure more robust results and provide a more nuanced understanding of the relationship between boards gender diversity and the cost of capital. Additionally, taking the non-significant result in consideration, future research could use different measures for cost of equity to potentially capture the still fairly unexplored complexity of this relationship.

In conclusion, this thesis fulfills its purpose and contributes to the knowledge of the relationship between board gender diversity on Swedish public corporate boards and their cost of capital as a whole but also cost of equity respectively cost of debt separately, where the evidence suggests a positive impact on cost of capital and cost of debt. These insights might affect corporate strategies to put more effort into board gender diversity and thereby enhance the governance efficiency and reduce the capital costs, as long as stakeholders continue to emphasize on factors such as risk and strong corporate governance.

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Appendix

Table 1 - Summary statistics

Summary statistics 1

	Mean	Median	SD	Min	Max	N
Boardsize	5.84	8	3.69	3	28	6427
Totaldebt win	627.17	185.15	953.79	.58	6207.01	6427
MTB win	2.53	.97	5.03	0	37.84	6427
ROA win	.03	.03	0.05	-.25	.18	6427
Capex win	36087954	1940278.5	1.35e+08	0	1.060e+09	6427
Debttoassetratio win	.43	.31	.217	.01	.92	6427
logassets	4.74	4.6	2.52	.03	10.02	6427
Womenboard	.25	.33	0.16	0	.75	6427
Women Over 25 %	.23	0	0.5	0	1	6427
Firmid	653.17	653	376.22	1	1306	6427

Table 2 - Hausman Test

Test of H0	Difference in coefficients not systematic
Chi2	86,54
P-value	0,0000

Table 3 - Fixed Effect regression results

Regression results

	(1) D/A	(2) WACC	(3) COD	(4) COE
WomenOver25Percent	-7.170***	-0.001*	-0.001**	-0.000
	(2.573)	(0.001)	(0.001)	(0.001)
Board size	-1.415**	-0.000	-0.000*	-0.001
	(0.711)	(0.000)	(0.000)	(0.000)
Return on assets	45.000	0.001	-0.025***	-0.006
	(32.486)	(0.011)	(0.005)	(0.011)
Market to book value	-0.167	-0.000	-0.000***	-0.000***
	(0.820)	(0.000)	(0.000)	(0.000)
Capex	0.000***	-0.000	-0.000	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Logassets	-55.539***	0.002***	0.000	0.002***
	(3.403)	(0.000)	(0.000)	(0.001)
Debttoassetratio		0.000***	-0.000	0.000***
		(0.000)	(0.000)	(0.000)
_cons	329.340***	0.070***	0.044***	0.078***
	(17.338)	(0.003)	(0.002)	(0.004)
Observations	6427	6427	6427	6427
R-squared	0.242	0.108	0.444	0.087
Year Control	YES	YES	YES	YES
Industry Control	YES	YES	YES	YES
Standard errors	Clustered	Clustered	Clustered	Clustered
Method	FE	FE	FE	FE

Robust standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Table 4 - POLS regression results

	(5)	(6)	(7)	(8)
Regression results				
	D/A	WACC	COD	COE
WomenOver25Percent	-28.361***	0.000	0.003***	0.003**
	(3.485)	(0.001)	(0.001)	(0.001)
Board size	1.999***	0.000	-0.001***	-0.000
	(0.475)	(0.000)	(0.000)	(0.000)
Market to book value	0.690	0.001***	-0.000***	0.000***
	(0.508)	(0.000)	(0.000)	(0.000)
Return on assets	174.560***	-0.007	-0.047***	-0.039***
	(26.120)	(0.009)	(0.005)	(0.011)
Capex	-0.000***	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Logassets	-43.561***	-0.000**	-0.001***	0.002***
	(1.243)	(0.000)	(0.000)	(0.000)
Debttoassetratio		0.000***	-0.000*	0.000***
		(0.000)	(0.000)	(0.000)
_cons	235.022***	0.063***	0.032***	0.063***
	(8.923)	(0.001)	(0.001)	(0.002)
Observations	6427	6427	6427	6427
R-squared	0.439	0.061	0.329	0.042
Year Control	YES	YES	YES	YES
Industry Control	YES	YES	YES	YES
Standard errors	Robust	Robust	Robust	Robust
Method	POLS	POLS	POLS	POLS

Robust standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

Table 5 - Industry classification

Industry	Classification
Basic Materials	1
Consumer Discretionary	2
Consumer Staples	3
Energy	4
Healthcare	5
Industrials	6
Real Estate	7
Technology	8
Telecommunications	9
Utilities	10